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Improving the Effectiveness of Aircraft Cabin Safety Briefings

Prepared for

Transportation Development Centre
Transport Canada

by

Behavioural Team, A Corporation
and
Rutenberg Design Incorporated

October 2002

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16. Abstract

The objective of this study was to improve the effectiveness of aircraft cabin safety briefings for all passengers, including those with sensory and cognitive disabilities. Working with Transport Canada regulatory authorities, and with the cooperation of Air Canada, efforts were directed at a single group-delivery approach for all passengers, supplemented by improved individual briefings.

First, the human factors requirements of passengers with communication limitations were identified. Then improvements to the scripting and presentation of messages were made. Using the improved materials, a test video was prepared for comparison with a group safety briefing video currently in use. The test video used the visuals of the Air Canada Airbus A340 video with a different narration and full-screen text that recapitulated the narration.

Comprehension tests were conducted with a sample of 32 participants, using quantitative assessments of recall following exposure. Each participant was shown only one of the videos. These tests showed substantial improvements for the test video. Comprehension rates for impaired as well as non-impaired passengers rose appreciably.

	Deaf	Hard of Hearing	Blind	Cognitively Impaired	Not Impaired
Improvement over existing video briefing	103%	89%	57%	136%	45%

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16. Résumé

Cette étude avait pour objectif d'améliorer l'efficacité des exposés sur les mesures de sécurité diffusés à bord des avions, pour qu'ils soient bien compris par tous les passagers, y compris ceux ayant une incapacité cognitive ou sensorielle. Les travaux, menés en collaboration avec les autorités réglementaires de Transports Canada et avec la coopération d'Air Canada, privilégiaient une démarche consistant à s'adresser à tous les passagers à la fois, complétée, au besoin, d'exposés individuels améliorés.

Les besoins des passagers ayant une incapacité sur le plan de la communication ont d'abord été définis. Puis, des améliorations ont été apportées à la scénarisation et à la présentation des messages. Ce nouveau matériel a servi à produire une vidéo d'essai, qui a été comparée avec une vidéo actuellement diffusée à bord d'avions. La vidéo d'essai reprenait les images de la vidéo de l'Airbus A340 d'Air Canada, mais avec des commentaires différents et un plein écran sur lesquels étaient reproduits ces commentaires.

Des tests de compréhension ont été administrés à un groupe de 32 sujets. Ceux-ci devaient donner une indication quantitative de leur souvenir de la vidéo, après visionnement. Une seule des vidéos était présentée à chaque sujet. Les tests ont révélé que la vidéo d'essai représentait une amélioration substantielle par rapport à l'ancienne vidéo. En effet, les taux de compréhension de tous les sujets, handicapés et non handicapés, étaient de beaucoup supérieurs lorsqu'ils avaient visionné la nouvelle vidéo d'essai plutôt que l'ancienne.

	Surdité	**Dureté d'oreille**	**Cécité**	**Incapacité cognitive**	**Ancune incapacité**
Amélioration comparativement à la vidéo actuellement en usage	103 %	89 %	57 %	136 %	45 %

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SUMMARY

The objective of the present study is to enhance the effectiveness of aircraft safety briefings through improvements to passenger communications. The aim is to ensure that the briefings are easily understood by all passengers, including those with sensory or cognitive impairments.

Working closely with Transport Canada regulatory authorities, and with the cooperation of Air Canada, efforts were directed the best possible single delivery approach for all passengers, taking into account the requirements of regulators, service providers, and the travelling public.

The human factors requirements of passengers with communication limitations were identified. Then improvements to scripting of messages were outlined. A mock-up test video was prepared for purposes of comparison to an existing group safety briefing video. The test video used the visuals of the Air Canada Airbus 340 video but with a different voice-over narration and with full-screen text which recapitulated the spoken text.

Comprehension tests were conducted with a sample of 32 participants using quantitative assessments of the number of messages they could recall following exposure to one of the videos. These tests showed substantial improvements for the enhanced mock-up video despite greater familiarity with the Air Canada video. As a result of the changes made, comprehension rates for impaired as well as non-impaired passengers rose substantially.

	Deaf	HoH	Blind	Cog	NI
Improvement	103%	89%	57%	136%	45%

Even with appreciable improvements to the group briefing, the need for a sequential approach remains. This approach recognizes the economic and efficiency benefits of trying to communicate first using a group briefing to reach the most people. But for those the airline can't reach using the group briefing, subsequent individual briefings are required.

Recommendations for the next steps to make this work applicable to airlines in Canada are discussed in the final chapter. Next steps include:

- creating a database of safety information messages,
- testing of messages and the means of delivery to ensure effectiveness for the widest audience of passenger,
- ensuring that test of recall and comprehension are reflected in actual passenger physical behaviour not just verbal behaviour,
- reviewing the media of communications within an airplane environment so that these media work well for passengers with the range of sensory abilities, and
- while the present project relates to the communication of safety and operational information, more basic questions need to be asked with regard to the quality of the design of life-safety gear and airplane furnishings and steps taken to improve designs.

SOMMAIRE

Cette étude avait pour objectif d'améliorer l'efficacité des exposés sur les mesures de sécurité diffusés à bord des avions, pour qu'ils soient bien compris par tous les passagers, y compris ceux ayant une incapacité cognitive ou sensorielle.

Les travaux, menés en étroite collaboration avec les autorités réglementaires de Transports Canada et avec la coopération d'Air Canada, visaient à déterminer la meilleure démarche possible pour s'adresser à tous les passagers à la fois, en tenant compte des besoins et des exigences des organismes de réglementation, des transporteurs et du public voyageur.

Les besoins des passagers ayant une incapacité sur le plan de la communication ont été définis. Des améliorations ont été apportées à la teneur des messages. Une vidéo d'essai a été produite, aux fins de comparaison avec une vidéo de sécurité actuellement en usage à bord des Airbus A340 d'Air Canada. La vidéo d'essai reprenait les images de la vidéo d'Air Canada, mais avec des commentaires différents et un plein écran sur lequel étaient reproduits ces commentaires.

Des tests de compréhension ont été administrés à un groupe de 32 volontaires. Ceux-ci devaient indiquer le nombre de messages qu'ils se rappelaient, après le visionnement d'une des vidéos. Ces tests ont révélé que les sujets se rappelaient beaucoup plus la vidéo d'essai, même s'ils connaissaient mieux la vidéo d'Air Canada. Les taux de compréhension de tous les sujets, handicapés et non handicapés, étaient de beaucoup supérieurs lorsqu'ils avaient visionné la nouvelle vidéo d'essai plutôt que l'ancienne.

	Surdité	Dureté d'oreille	Cécité	Incapacité cognitive	Aucune incapacité
Amélioration	103 %	89 %	57 %	136 %	45 %

Il a été conclu que, malgré une amélioration appréciable des exposés de groupe, une démarche séquentielle demeure nécessaire. Une telle démarche permet de tirer avantage des coûts moindres et de la plus grande efficacité des exposés de groupe pour rejoindre la majorité des passagers. Mais, pour ceux qui ne sont pas en mesure de bien comprendre l'exposé de groupe, des exposés individuels subséquents s'imposent.

Le rapport recommande de s'attaquer aux tâches ci-après pour rendre les résultats des présents travaux applicables aux compagnies aériennes du Canada :

- Créer une base de données de messages sur les mesures de sécurité à bord des avions.
- Mettre à l'essai les messages et les moyens de diffusion, pour faire en sorte qu'ils soient bien compris par le plus large public voyageur possible.
- Améliorer les tests de mémorisation et de compréhension afin de prendre en considération le comportement physique autant que verbal des passagers.
- Revoir les moyens de communication utilisés à bord des avions afin de s'assurer qu'ils conviennent à des passagers ayant diverses incapacités cognitives ou sensorielles.
- Tenir compte des caractéristiques de conception et du caractère ergonomique de la cabine et de ses équipements, car ils influent de façon importante sur
  la capacité de livrer efficacement l'information de sécurité.

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1. INTRODUCTION

The objective of this study is to enhance the effectiveness of aircraft cabin safety briefings and to recommend improved communication practices to ensure that the briefings are easily understood by all passengers, including those with sensory or cognitive impairments. With the cooperation of Air Canada, efforts were directed at a universal delivery approach for all passengers, taking into account the requirements of regulators, service providers, and the travelling public.

It is no small challenge to produce on-board briefings that are understood by an acceptably large proportion of travellers. The circumstances of this communication setting reveal obstacles in the form of:

- the sound quality of the spoken message, which is harmed by high ambient noise levels, substantial interior sound absorption, the distance between the source and the listener, and the need to have an appropriate volume of sound at all points in the cabin;

- the visual quality of demonstrations, those on video as well as presented by an attendant, due to issues of lighting, image size, distances and degree of detail needed, interference in the line of sight, and image resolution;

- the intellectual aspects of the communication, as representing an imposed "training" event intended to shape passengers' behaviour, especially in relation to some emergency activities unlike any they have ever practised previously, with information including numerous, many subtle, and even counter-intuitive elements (for example, not activating lifevest air pockets until leaving the plane);

- the emotional context of the information, representing personal inhibitions (for example no-smoking policies or the free use of computers and electronic gear) or frightening or life-threatening events that are horrifying to the passenger; and

- the need to ensure comprehension among passengers with varied flying experience, intellectual capacity, sensory or communication impairment, language skills, cognitive or emotional states, and motivation.

Clearly, it is hard to achieve a high degree of behavioural effectiveness of a group safety briefing under these circumstances. However, regulators require airlines to provide individual briefings to passengers who the flight attendants feel might be poorly served by the group briefing.

This report presents an effort to enhance the effectiveness of the aircraft cabin safety briefing as it applies to persons with impairments and without. Inevitably, steps that foster an aggregate improvement for people with shortcomings of vision, hearing, and cognition, pretty much ensures improvement for non-impaired people.

A mock-up of an improved group briefing was created as a "proof of concept" and to illustrate improvements. In the form of a video briefing, it was tested for comprehension using a currently used Air Canada Airbus A340 video briefing for comparison. The report includes recommendations and guidelines for better briefings.

2. ADDRESSING THE ERGONOMIC REQUIREMENTS OF TARGET GROUPS

For this study, six target groups of passengers were considered:

- Passengers who are blind
- Passengers who are visually impaired
- Passengers who are deaf
- Passengers who are hard of hearing
- Passengers with impairments that limit communication
- Passengers with none of the above impairments and no other threats to good communication

2.1 Passengers who are blind

A person is considered legally blind when visual acuity (sharpness of vision) is 20/200 or worse after correction, or when the field of vision is less than 20 degrees in the best eye after correction. Passengers who are blind depend on audio, tactile, and olfactory information. Most cannot rely on visual information, although some can distinguish between light and dark, or see shapes.

Functional Limitations

- see or interpret visual displays (e.g. on monitors or by attendants demonstrating features)
- be aware of emergencies and exceptional circumstances that are evident to other passengers from visual evidence
- see other passengers in their path
- see other passengers reaching across in front of them
- read text messages in the cabin, on monitors, in washrooms,
- read signs
- use controls that require hand/eye co-ordination, e.g. cursor on screen

Onboard Information Difficulties

- orientation within the aircraft, including finding a seat, storing aids, finding a place for the guide dog
- identifying the location of cabin destinations such as washrooms, including finding paths to them
- identification of emergency exit(s)

- use of evacuation slide with guide dog
- identification, location and use of features such as the lifevest, oxygen mask, call button for attendant
- operation of meal tray
- interpretation of audio messages that are designed to be accompanied by visual or video demonstrations (e.g. safety demonstration, safety video) or successfully using spoken directions with inherent reliance on vision
- emergency instructions in panic situations (environmental noise drowning out audio instructions)
- protection against falling objects in emergency situations (e.g. hand baggage from overhead bins)
- use of onboard phone

2.2 Passengers who are visually impaired

Visual impairments can be caused by cataracts, glaucoma, retinal disorder, macular degeneration, diabetic retinopathy, or retinal detachment. These impairments may have started much earlier in life, with time for successful behavioural and technical adaptations. Adaptations to a visual impairment and the resulting degree of handicap can vary greatly.

Functional Limitations

- see clearly at far distances
- focus on near objects
- focus at night
- have a binocular view of their environment
- see things clearly with glare
- have peripheral vision, and may have tunnel vision
- distinguish between colours
- see clearly, but with a foggy aspect
- experience exacerbated impairment under emergency conditions as a result of compromised behavioural adaptation under stress or failure of technical assistive devices

Onboard Information Difficulties

- orientation within cabin
- identification of seat number
- identification of overhead bin handle
- identification of obstacles in path (e.g. a handbag on floor)
- feet protruding into aisle
- reading text messages on. monitors
- reading small print (under 14 points)
- identification of visual images on monitor
- following a demonstration of features carried out by an attendant
- identification of exit locations
- balancing while walking in cabin during flight (e.g. reduced vision can impede ability to maintain balance)
- glare on screens, text, and signs can reduce interpretation accuracy considerably
- impaired vision can make a passenger's ability to function worse and lead to extreme insecurity in an unknown environment

Methods for Addressing Difficulties

The difficulties noted above can be addressed by ensuring application of generic and specific strategies:

- Provide facilities and operations that can be described and used with efficiency, safety, and satisfaction by blind persons as well as persons unable to see due to low light levels during emergencies.
- Provide information to customers that not contain or exclusively rely on inherently visual elements in descriptions of things. their locations. or their operation.
- Recognize the value of familiarization from other life activities or familiarization a passenger gains after boarding.

2.3 Passengers who are deaf

Deafness means an inability to discriminate conversational speech through the ear. A person is considered deaf when sound must reach at least 90 decibels (5 to 10 times louder than normal speech) to be heard and even amplified speech cannot be understood. People who are deaf cannot use their hearing for communication.

Functional Limitations

- cannot differentiate between sound elements
- cannot hear elements distinctly
- cannot converse with another person by ordinary means

Onboard Information Difficulties

- comprehension of PA announcements, e.g. flight conditions, weather, changes
- hearing attendant's voice (e.g. meal selection, although with speech reading, can achieve some degree of communication)
- comprehension of a voice track of a safety demo (attendant's voice or video)
- interpretation of verbal instructions for emergency or evacuation
- use of onboard phone
- unable to hear sound track of video/film
- hearing any other passengers' voices

Methods for Addressing Difficulties

These difficulties often encountered by deaf passengers can be addressed through ensuring application of generic and specific strategies:

- Provide facilities and operations that can be described and used with efficiency, safety, and satisfaction by deaf persons as well as other persons unable to hear due to competing sounds masking audible or spoken signals or to material changes to their hearing during emergencies
- Provide information to passengers that does not contain or exclusively rely on inherently auditory elements in descriptions of things, their locations, or their operation
- Provide non-verbal means of communicating with deaf passengers including communication between passengers
- Recognize the value of familiarization from other life activities or familiarization a passenger gained after boarding

2.4 Passengers who are hard of hearing

Hard of hearing means any degree and type of auditory disorder. Causes for hearing disabilities can be congenital (before birth), effect of certain drugs, disease

process, or severe ear infections. While hearing loss can be found in all age groups, the loss of hearing acuity is part of the natural aging process. With an increasing aging population, the number of people with hearing difficulties will increase.

Functional Limitations

- hear high and/or low frequency tones
- differentiate between tones
- block out background/environmental noise
- hear sounds with stereo localization

Onboard Information Difficulties

- comprehension of audio announcements over PA system
- communication with attendant,
- use of the onboard phone
- communication with fellow passengers
- comprehension of the audio track of the safety video demo, the sound track for film/entertainment, or the audio emergency and evacuation instructions

Methods for Addressing Difficulties

Better communication for hard of hearing passengers includes louder and clearer speech — which is sometimes achieved by simply reducing the distance between speaker and listener — and/or softer or otherwise controlled interfering noise. Non-auditory support ranges from written texts equivalent to the spoken message, to the ability to see the speaker and thus benefit from speech-reading techniques.

2.5 Passengers with impairments that limit communication

Cognitive disabilities can vary widely, are often invisible, and have no distinctive characteristics or appearances. They can range from difficulties with perception, memory or learning, pace, and comprehension, to severe mental illness or retardation and dementia.

Cognitive disabilities can be learning related, memory related, perception related, conceptualizing, and mental retardation. They can also include psychological, emotional, and communication disorders.

Functional Limitations

- perceive and/or discriminate between particular situations and variables
- recognize and remember persons, places, and events
- ignore irrelevant stimuli
- retrieve and process information fast enough
- demonstrate spatial orientation and visual-motor integration
- demonstrate learning rates
- divide attention between several tasks
- search and scan activities that require selective attention

Onboard Information Difficulties

- identification and comprehension of features and facilities within the cabin and washroom (e.g. seat identification, washroom location and controls)
- identification and use of seat belts, oxygen mask, lifevest, attendant call button
- identification of emergency exits
- communication with attendant
- comprehension safety demo and content
- use of onboard phone
- interoperation of emergency and evacuation procedures
- comprehension of PA announcements

Methods for Addressing Difficulties

Approaches to serving these passengers are as varied as the conditions. In general, enhancements in information design assist all passengers, not just persons with cognitive limitations. For cabin-wide briefings, the usual approach of soliciting feedback from the passenger as to whether they understood the message can be applied, although it requires identification of the target passengers and individual attention to their requirements.

2.6 Passengers with none of the above impairments

When tested for comprehension, many routine communications — such as highway signs, weather forecasts, or building wayfinding signs — are poorly understood and even misperceived by substantial numbers of people. Sometimes the failure of communication becomes readily if painfully self-evident to the user.

as when a highway exit is missed. Other times the error is not readily caught, as when weather events prove unexpected due to misunderstanding what "partly cloudy" means or when the receiver has died due to the failure of communication and there is no one to bear testimony. Finally, the error may be self-evident, but the circumstances of the discovery of the error may be highly disadvantageous such as when guests vainly seek emergency egress during a hotel fire.

Expectations for what air passengers will understand from even well-prepared briefings should be conservative unless effectiveness has been tested and confirmed. In principle, there is no difference in the responsibility of ensuring that persons with notable sensory impairments comprehend messages than persons with no particular impairments. Communication on airplanes is often poor even when there is no communication impairment and that includes messages of a life-safety character included under the auspices of regulation.

As discussed in section 3, the communications environment in an airplane is lousy. Noise levels, when engines are running, are very loud and vary over time and over the cabin space. The goodness of views of information on monitors likewise can vary, ranging from poor to terrible and as a result of inadequacies of the equipment, ill-informed choices of media format and presentation of the material, geometry and viewing distances between the viewer and the monitor, and various kinds of interference from glare and interposed people and objects. Aside from the great variations on individual sensory powers, the state of mind of individuals may be unreceptive to the briefing content. And all these obstacles to minimal effective communications are a simple and largely self-evident reality which those responsible for preserving lives need to recognize.

Viewed as a life-or-death learning class, entirely novel air-passenger behaviours need to be mastered in one hurried "lesson." Yet the life-saving gear is not handled and no practice is provided to the "students"... just some pictures and hurried descriptive words for their guidance. Moreover, we have a poor "schoolroom" in terms of "student" attitude, physical environment, and finally, the topic of this research report, the communication substrate which supports this schooling.

3. ADDRESSING THE HUMAN PERFORMANCE CONSTRAINTS OF ON-BOARD BRIEFINGS

3.1 Group cabin safety briefing

3.1.1 Problems

Group safety briefings are subject to many challenges to comprehension. First, there are the routine challenges of communication — finding the right terms for the audience and expressing them effectively. But, there are also visual components — whether in a video or live demonstration — and these need the same care. For those who cannot hear or who have trouble hearing due to the environment or to a hearing loss, messages should be presented in an effective text format. Finally, qualities of sound and sight need to be considered.

Ordinarily the first step in ensuring good communication is a critique of the messages themselves. What needs to be said? Can it be omitted? Can technical and ergonomic improvements be made to the airplane and equipment that would lead to a better flight?

The general principles of making computer software "user friendly" apply as well here. Why do life jackets need two inflation triggers? Why aren't exits painted in distinctive and hence readily noticed colours? Why don't trays lock automatically when raised? Why can't radios be designed to be impervious to interference from laptops? Are all the strictures strictly related to greater life safety in the air? Each improvement to design results in easier communication of instructions and makes the flight experience more "user friendly."

It is assumed that great care has gone into design, safety, and regulatory issues. It is not the task of this project to dispute any requirement; rather, this project takes the messages as "givens" and works from there to improve their comprehension.

An airplane environment offers multiple challenges to good communications including:

- poor sound quality of the spoken message which is harmed by ambient noise, substantial sound absorption, distances, and the need to have an appropriate volume of sound at all points in the cabin;
- the visual quality of demonstrations, those on video as well as presented by an attendant, due to issues of lighting, image size, distances and degree of detail needed, and image resolution;
- the intellectual aspects of the communication as representing a "training" event intended to shape the passenger's behaviour especially in relation to some emergency activities unlike any they have ever practiced — now or ever previously — with the information including numerous, many subtle, and even counter-intuitive elements (for example, not inflating the life jacket air pockets until leaving the plane);
- the emotional context of the information representing personal inhibitions (for example smoking or free use of computers) and life-threatening events; and
- the need to ensure comprehension among passengers with varied flying experience, intellectual capacity, sensory or communication impairment, language skills, and motivation.

3.1.2 Solutions

To improve the communication of messages such as are contained in a safety briefing, principles of information design can be applied, including the following:

- Choose messages that are needed and avoid non-essential messages.
- Use terms that are meaningful to the listener and take care to avoid the specialized language of the air travel professional.
- Use short and simple sentences.
- Establish favourable attitudes in listeners.
- Ensure that sight and sound variables are addressed.

3.2 Individual safety briefing

Flight attendants are trained to provide individual briefings to passengers who need them. These include (a) people who have a self-evident need for additional or custom briefing (for example, people who were obviously distracted by other matters during the group briefing or who are blind), (b) those who self-identify as

needing additional help, and more vexingly, (c) those who need help but don't know it and don't show it.

Section 2 addressed specific issues for those with communication impairments. The key approach, as taught in sensitivity courses, is to be responsive to the individual's present level of information, their readiness, receptivity, or capacity for more, and in general, allowing the passenger to indicate the path to take.

4. REVISIONS TO SAFETY COMMUNICATIONS

The communication of safety information is structured sequentially to provide all messages to everyone who may have failed to grasp the safety communications in the initial group announcement. First, there is the general group cabin safety briefing, which presents the main series of messages for all to hear and see. Next, personal briefings are available, tailored to individuals. Then, staff can walk through the cabin and, by observing behaviour, detect implicit deficiencies of information. Finally, passengers can hail staff if they have questions.

This section presents revised scripts for the group and individual safety briefings. For simplicity, the project team decided to work in depth on a single airplane. The focus was on a briefing environment that is reasonably representative of large airplanes, Air Canada's A340. For research purposes, the Air Canada A340 video serves as a stable benchmark.

It is apparent, however, that the video was not prepared by psychology professionals because it has more in common with TV advertising than safety instruction. The general impression is that it is certainly not inferior to the range of taped or live briefings and far better than some. It reflects common accepted practice. It contains the appropriate content. Presumably, it has the approval of all regulatory bodies in Canada and abroad.

4.1 Revision strategy

Given the present constraints of aircraft, procedures, regulations, traditions, staff, and physical communications, it was the intention to produce a test video comparable to the AC A340 video. Within these constraints, there are a few strategies for the enhancement of comprehension to all passengers

- improve terms, phrasing, and sentences of messages,
- present messages that can also be read (captioning),
- in addition to scripting per se, improve sound and spoken articulation.

The first task involved in creating the revised scripts was to identify and document the elemental messages contained in the general oral briefing. This included identifying what needs to be communicated to passengers and what may not be effective for passengers with impairments.

Identifying and documenting messages is not a straightforward task as many messages are conveyed through subtle visual or sound cues. For example, to learn how to use a oxygen mask properly, you need to have some sense of how the mask is located on the face, how tight the straps should be, and how firmly you tug on the little plastic air hose. The degrees of emphasis, energy, or importance are important messages. Yet these may be poorly or even incorrectly communicated by professional narrators unless the underlying message is clearly understood by those who are creating the message. The task of documenting all these subtle points was not undertaken in this project.

4.2 Matrix of messages and obstacles

A table was created to depict group briefing messages rescripted for improved comprehension in relation to basic communication impairments. The table also describes visual elements. Please see Appendix A. The text shown in the table was used to create the test video used in the comprehension tests discussed in section 5.

Tables of messages re-scripted for comprehension for the individual briefings also are shown in Appendix B.

4.3 Illustration of improvements to the group briefing script

RATIONALE	NEW SCRIPT AUDIO
Begin by saying what you want of the listener.	1. Welcome aboard Air Canada. Please listen carefully to these safety instructions and follow any other instructions from the crew.
Passengers must have a clear notion of what goes where.	2. Please place small or light things in the overhead bins; put heavier things under the seat in front of you.
Plain, behaviourally-connected terms reduce ambiguity about what to do.	3. Put your seat back straight up by pressing the button on the armrest. Lock your tray table. Click your seat belt closed and then make it snug around your hips by pulling the loose end. To open your belt, lift up the cover.
You must wear seat belt	4. Seat belts must be worn at all times when seated. Return to your seat whenever the seat belt sign lights up or a spoken announcement is made. Do not smoke anywhere on this airplane.
Avoid ambiguous terms like	5. Cell phones, pagers, CD players,

"similar devices" if you can.	computers, or similar devices cannot be used until after take-off. Then wait until you are told what devices are OK to use.
	6. Right now, look for your nearest emergency doors or wall openings. In an emergency, lights in the aisles will guide you out.
	7. Look in the seat pocket in front of you for the safety instruction card. It explains the safety features of this aircraft. Please review it. A Flight Attendant can also give you one in Braille.
	8. In a high altitude emergency, an oxygen mask will drop in front of you from the panel above. Place the mask over your mouth and nose, straighten out the strap, and pull the strap to be sure it is tight on your face. After you are wearing it securely, a tug on the hose will start the oxygen flow. It makes sense to put your own mask on first, *before* helping others.
A plain term like "life jacket" is better than a circumlocution intended to circumvent anxiety. Ensure that the design elements of the life jacket that the user must note or manipulate are captured precisely in the instructions. If the elements cannot be effectively described, change the design, for example, "Pull the square tags that are bright purple...."	9. Every passenger has a folded life jacket in a pouch under your seat or under your armrest. If the airplane has to land in water, grab the life jacket. Put your head through the hole and then pull the jacket over your head. Locate the waist belt, click the belt clip closed, and tighten the belt. To inflate, pull the tabs at the end of the cords; these are connected to little air tanks inside the jacket. If that does not inflate the jacket, then do it yourself by blowing into the tubes. Do not start to fill the life jacket until you are leaving the airplane.
	10. Thank you for choosing Air Canada. We wish you a pleasant flight. If you think you might have trouble following these instructions, please speak with a Flight Attendant.

5. RESULTS OF COMPREHENSION TESTS

5.1 Rationale

The rationale for the testing was based on the need to establish appropriate principles of communication while exploring aspects specific to passenger safety. The testing materials should serve as illustrations of the application of these principles. Finally, it was necessary to ensure that conservative test procedures were used so as to produce unambiguous results and avoid disputes or conflicting interpretations of findings.

It was decided to prepare a general cabin safety briefing, incorporating principles of good information design. To provide a standard of comparison, the new briefing was prepared as a voice-over using the Air Canada Airbus A340 briefing video with texts added. The testing compared comprehension of the original Air Canada videotape and the new mocked-up one with new voice-over.

5.2 Procedure

5.2.1 Video briefings

The Air Canada briefing runs about 4.5 minutes and has music along with professional announcers alternating in English and French. The announcers speak in a manner that may be thought of as halfway between training-speak and TV advertising. A short animation shows the location of emergency exit ramps. Production values are high and the video and soundtrack might be described as "glossy."

The test briefing runs about 6 minutes. It is narrated in English by an experienced female speech therapist recorded using high-quality sound gear in an anechoic chamber. Needless to emphasize, her articulation is as could as could be! There is no music. The addition of full-screen captions accounts for the added length as compared to the AC version.

The visual elements are uncut from the Air Canada version. The script was recorded in synchronization with the visuals. In addition, the *entire* spoken script appears as full-screen captions, following its spoken presentation. Due to the successive dubbing steps in the production chain of the test video, the final visual results were fuzzier than the original. Likewise, the sound track was somewhat degraded from the original taping of the speech therapist. That would, of course,

count against the comprehendability of the test video which never the less, and as we will soon see, proved to be far superior to the existing material.

5.2.2 Method and sample

Thirty-two volunteers were shown one of the videos and then were asked to write all they could remember on a questionnaire. The questionnaire helped organize the volunteers' answers — and fostered the reliability of scoring answers — by dividing the messages into five sections corresponding to the sequence of the video plus a sheet at the end for additional recollections.

Most volunteers viewed the videos in groups of four to seven persons, in a quiet room. Although meant to bear some resemblance to an ordinary cohort of air travelers, all participants seemed to be sober. Where a communication or sensory impairment interfered with the ability to self-complete the written questionnaire, the person was tested individually with the questions spoken and answers recorded by the tester. Respondents also indicated how many individual flights they had taken in the past five years.

Three **deaf** volunteers were shown the AC video and three the test video.

Three **hard of hearing** volunteers were shown the AC video and three the test video.

Three **blind** volunteers were shown the AC video and three the test video. These participants were tested individually since the questions had to be read to them and their responses spoken; this required individual rather than group testing.

Three persons with **cognitive impairments**, typically brain damage through stroke or severe epilepsy, were shown the AC video and three the test video, and they were also tested individually.

Four volunteers with **no impairments** were shown the AC video and four the test video.

Volunteers were adults ranging in age from 20 to 70 with approximately the same number of men and women. All volunteers received a $25 honorarium for their efforts.

5.3 Results and implications

5.3.1 General findings

All groups recalled appreciably more messages from the test video than from the AC video indicating that the test video was appreciably more effective in conveying safety information. The data shown below indicate that for several test groups, the amount of information retained has doubled through better and more accessible information design of the test video. That is the basic finding of the study: the amount of safety information which can be recalled can be greatly increased.

When expressed in terms of the number of messages recalled...

	Deaf	HoH	Blind	Cog	NI
Air Can.	8.0	10.3	12.7	12.5	17.2
Test	16.2	19.5	20.0	29.5	25.1

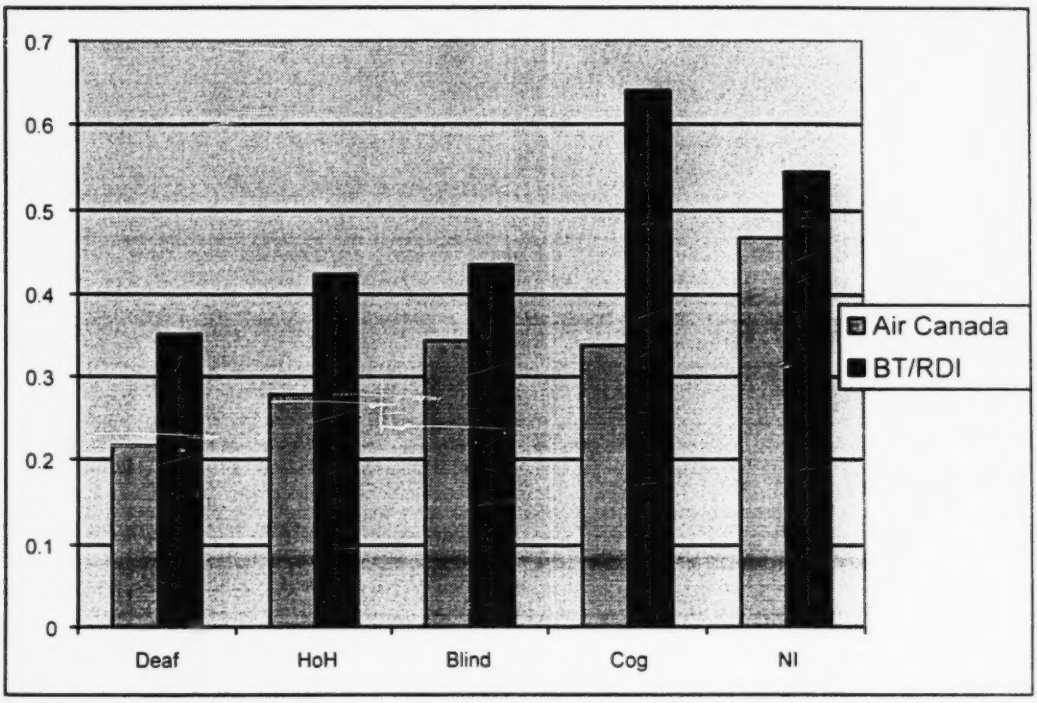
When the frequencies in the previous chart above are expressed in terms of percent improvement of the test video compared to the AC video...

	Deaf	HoH	Blind	Cog	NI
Improvement	103%	89%	57%	136%	45%

The AC video contained 37 individual messages, while the test video had 46. Therefore, results might also be analyzed in terms of percent of messages recalled from within each set, as shown below. Again, all groups did distinctly better on the test video. Please see the Appendix C for lists of the messages.

When expressed as the proportion of messages recalled from each video set...

	Deaf	HoH	Blind	Cog	NI
Air Can.	22%	28%	34%	34%	47%
Test	35%	42%	43%	64%	55%



5.3.2 Detailed findings

The two videos had roughly the same messages and sequence of presentation. The test video had additional messages because it gave more details about electronic devices and lifevests, 46 messages versus 37.

First, combining the data for all volunteers, as Table 1 shows, the test video is appreciably better in conveying information about storage and the oxygen mask and somewhat better regarding exits and life jackets.

Table 1: Percentage of Messages Recalled by All Volunteers for Specific Topics

AC	Test	
37%	57%	Storage
54%	57%	Devices
30%	40%	Exits
37%	61%	Oxygen mask
39%	49%	Life jacket
3%	5%	Other

Table 2 looks only at data for the four non-impaired volunteers in each video group. Even with this small group, results are about the same as for the combined data. There appears to be a shortcoming in the life jacket recall for the test video for the non-impaired group although given the small sample, findings at this micro-level of analysis are not trustworthy.

Table 2: Percentage of Messages Recalled by Unimpaired Passengers for Specific Topics

AC	Test	
49%	68%	Storage
71%	71%	Devices
38%	56%	Exits
48%	59%	Oxygen mask
59%	45%	Life jacket
10%	0%	Other

Viewed in absolute terms, the AC video as comprehended by non-impaired persons results in about half the messages being recalled and the AC video is inferior to the test video in most subject categories.

Looking at particular messages is informative.

Some messages seem to have no useful instructional purpose or are self-evident: those listed below are recalled by fewer than 10% of the volunteers:

- sit comfortably for take-off (AC)
- remain seated when the oxygen mask drops (AC)
- return to your seat if asked to do so (poor in both AC and test)
- tighten life jacket belt (AC but not test)
- review card prior to take-off (AC)
- follow instructions from crew; ask crew for information (AC and test)

A number of other messages would be self-evident for some passengers but not for others. These fall into intermediate levels of recall.

Some instructions seem important yet are not recalled by a majority of passengers. particularly in the AC video:

- adjust belt around hips (AC)
- use seat belts at all times (poor in AC but not test)
- aisle lights will guide you to exit (AC but not test)

- nearly all the messages concerning the oxygen mask (AC but good recall in test)
- nearly all the messages concerning the life jacket (AC and test)

5.3.3 Past experience with safety briefings and degree of recall

Volunteers were assigned to AC or test groups largely at random but with some effort to balance for gender and age. In completing the questionnaire, they indicated the number of individual flights they had taken in the past five years. The travel experience of the test video sample was more than the AC group. Median number of trips was 4 and 11 (and ranges 0 to 20 and 0 to 200) for the AC and the test groups.

Is there a relationship between past exposure to cabin safety briefings and the extent of comprehension and recall? Oddly, there is a relationship for those who were shown the AC video but not for those shown the test video.

There is a middle-sized correlation of .43 between amount of recent air travel and amount of recall. This may be due to several causes. First, there may be learning taking place. Second, non-impaired volunteers, who had greater flying experience, also had greater recall of the AC messages. With non-impaired volunteers removed, a correlation of .25 remains, indicating that both causes are likely to have some influence for recall of AC messages.

There is no relationship between flying experience and the ability to recall messages in the test video; the correlation is -.12 (omitting non-impaired travelers, the correlation is -.04). It is fortunate that no relation was found because it means that the measurement of recall of the test video is reliable and it is uninfluenced by the degree of recent flying experience.

A number of implications may be drawn from these data.

- Not surprisingly, there is a learning effect evidenced by the fact that those who have flown more, recall more of the AC video. There is, of course, no direct learning effect possible with the test video since no one had seen it before.
- Less favourably, it can be inferred that the degree of recall of the AC video that might be expected of a first-time flyer is poorer than the results reported here because no prior learning could have taken place to enhance their

recall. Therefore, the effectiveness of the AC video would be worse than what we have measured for new flyers.

- The marked improvement shown by the test video group was demonstrated despite the learning advantage that enhanced recall of the AC video in this experiment.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions of the research

There are messages that need to be conveyed to air passengers with regard to safety and orderly operations. Each message must reach every passenger, regardless of any communication impairment they have. However, there are different channels of communication that airline personnel can use to ensure that messages are received.

The most economical channel of communication is a well-developed group briefing, presented by a crewmember or on video. But when the group briefing does not suffice to carry a message to a given passenger, there remains the possibility of presenting an individual briefing that can be configured to individual needs, strengths, and limitations.

This study has demonstrated improvements in the successful comprehension and recall of cabin safety briefing messages. For persons without significant sensory or communication impairments improvement was 45%. For blind participants, the improvement was 57%; deaf persons, 103%, hard of hearing participants, 89%; and for those with cognitive impairments such as arising from strokes, 136%.

These improvements were brought about through techniques of full-script captioning, use of a very clear voice-over, and applying principles of information design to develop simple and effective instructions.

6.2 Recommendations

6.2.1 Create a database of messages

An air traveller today is presented with a large number of messages that, in terms of life safety significance, range from carrier promotional fluff to life jacket inflation procedures. Life safety announcements may be interspersed with messages seeking to enhance the profit or convenience of the airline. Passengers may not be able to distinguish between the two.

Presented without their justification, some instructions may puzzle travelers... which is certainly not favourable to fostering compliance. They may have reason to think their cell phone will not interfere with the plane's avionics. Or, the passenger may feel certain instructions needlessly inhibit their riding prerogatives, are merely traditional and perhaps should be re-considered, are really for the convenience of the air staff and not related to safety, seem counter-intuitive, or might even be wrong. It is conceivable that the customer is correct in this assessment. For example, the AC video might lead some passengers to think that their escape path will be highlighted by floor lights with apparent motion. In fact, this isn't so and it probably is a waste of valuable communication time to mention lighting at all.

At best, some safety messages are presented in a manner that leaves the passenger puzzled and perhaps unmotivated to follow the instructions. At worst, passengers may form an intention to act contrary to the puzzling instructions.

There are also messages that are subtle and not ordinarily responsive to the limitations of scripted discourse. These are messages with subtle gradations of "how much", "how urgently", or "just when", and even with the best editorial skills in the world are beyond the reach of effective spoken communication. These points need to be conveyed but ultimately they never show up in regulations or scripts. Indeed, there is no reason to be assured that authorities have suitably corralled and prioritized the full host of messages — quantitative, qualitative, perceptual, emotional, motivational, attitudinal, spiritual — that really need to be conveyed to best promote passenger well-being.

In addition to the feeding out of such messages, what questions arise in passengers' minds that should be proactively addressed? How hard do you pull the inflation tabs on the life jacket? Can you pull them so hard the mechanism would break? The passenger needs to be able to see the tabs being pulled, perhaps being able to observe a videotape actor (or their flight attendant) with hands which clearly communicate the degree of force needed and with lighting that catches the nuances of the hand movements.

For example, passengers are told not to inflate their life jackets until leaving the plane. No further explanation is given. There is no way for passengers to know whether they should inflate as soon as the plane hits the water or as soon as they have passed through the opening in the fuselage or anywhere in between.

Because of the absence of any clarification, passengers must inhibit the strong natural impulse to satisfy themselves at the earliest and driest possible moment that the mechanisms of the life jacket are working. What are they to do?

It must be recognized that, other things equal, each message added to a communication reduces the effectiveness of all the other messages. In other words, the goal for cabin communications, is to reduce the set of messages to those that are important, timely, or otherwise appropriate to present.

It is recommended that Transport Canada create an easy-to-use database of all the messages that might be presented to passengers. Such a database could have the following features:

- priorities for life safety or effectiveness assigned to messages.
- indications of when a message is poorly conveyed purely through language.
- in the case of reaching passengers with impairments, where in the sequence of media, group to individual, messages should be presented to them, and
- the exact, tested, or otherwise preferred wording of messages.

6.2.2 Test all the messages and means of delivery

This project tested the set of messages contained in the group briefing and those in the AC A340 video. However, there are other messages and other means of presentation (such as individual briefings to hard of hearing or blind travelers) that have not been satisfactorily covered. While the demonstration testing completed here is highly beneficial and illustrative for the direction needed for the future, it would be wise to test more messages and more media, as discussed in the next section.

6.2.3 Improve testing of recall, comprehension, and behaviour

Life-critical messages should be tested for effectiveness. Ordinarily, testing involves having participants write down their recollection of a message or tell a researcher directly after they have been exposed to the message. That is the procedure followed in this project. What does this prove?

In the case of spoken messages, the test conclusively demonstrates the ability of volunteers in a test setting (where they may or may not expect to be tested for goodness of recall) to retain information after a recent exposure. As such, the test represents a *necessary* pre-condition for behaviour. If a person cannot remember where the exits are, they cannot find them during an emergency.

This is not, however, a sufficient demonstration of either full comprehension or the likelihood of effective life-preserving behaviour at a much later point in time. For example, participants may recall being told not to use electronic devices until after take-off. But they may not know whether that includes their wristwatch, heart-rate monitor, pacemaker, hearing aid, and/or their personal-digital-assistant microcomputer? They may recall that they should blow into some tubes if their life jacket fails to respond to the pulled tabs, but not be sure where to find those tubes.

The situation for persons who are blind is illustrative. A blind person can respond well to questions requesting recall of instructions while not being actually capable of performing the actions from the instructions. Likewise, a deaf or hard of hearing person can be able to recall seeing a caption with the instruction, "When you hear the announcement, please return to your seat"!

Specialists in "information design" therefore distinguish a "ladder of proof" of recall, comprehension, and ultimately, successful behaviour arising from the communication. Most messages and most purposes are well served by simple, inexpensive, group-administered tests of recall of messages. But obviously, when life is at risk, there is good reason to move up the ladder of proof.

In other words, the tests conducted in this project clearly indicate weaknesses in existing briefings and clear directions for the future — as particularly applied to the messages and means of presentation tested by recall so far. It is recommended to expand the testing and move up the ladder as follows:

- Test more messages.
- Test more means of presentation.
- Assess with care whether or not people truly understand the messages and their implications or whether they are doing little more than parroting what they have heard in test situations.
- If possible, and without authentic risk to participants, assess whether people can successfully perform the behaviours and in real or simulated stressful circumstances.

Having urged more comprehensive studies, it is worth emphasizing that the basic comprehension results reported here are a fully adequate and trustworthy initial step. The results are meaningful, sobering, and providing valuable orientation for steps to follow, "up the ladder."

6.2.4 Address design issues

While this project addressed issues of communication, a comprehensive attack on effective communication properly begins with the underlying *substance* of the communication. Have we designed airplanes and their gear so that the messages work well? It is one thing to create the perfect floating life jacket, but another thing to have it deploy in a manner which can be quickly explained and understood by all who may need to use it in an emergency. While passengers may be instructed to look for an emergency exit somewhere toward the front of the plane and carved in the side-wall, it may be difficult to be able to spot it quickly and head right there.

There are designers engaged in these worthy goals. But safety goals are under pressure from aesthetics, marketing needs, price, need for uniformity among carriers, inter-jurisdictional agreements, the sensitivity of regulators to these issues, etc.

These problems also need to be viewed in light of the physical capabilities of travellers. In addition to the shortcomings of accommodation of persons with substantial mobility or sensory impairments, much of the equipment offered to the general public is suitable only for persons of exceptional fitness and presence of mind, and of average height and build. Even when items can be handled by people with a wide range of skills, the ergonomics may still be far from favourable, particularly when these skills need to be applied in an emergency.

Does this criticism apply to features in airplanes? For example, in an emergency, certain doors or fuselage exits may need to be opened by passengers. How much force, effort, perseverance, and level of instruction are actually required to do this? What force would be needed with an airplane in water or sitting at an angle? And, returning to the immediate purpose of this report, shouldn't the whole door be painted glow-in-dark yellow?

It is therefore recommended that consideration of the design and ergonomics of equipment for use by the flying public be undertaken.

6.2.5 Assess communication within an airplane environment

As the previous discussion of comprehension testing indicated, there is a "ladder" for proof. Another aspect of proving that communication works lies in testing *in situ*, in the real setting. For purposes of this study, there was little to be gained by exposing participants to real or simulated airplane conditions. While the *in situ*

conditions of video viewing and background noise may be far more terrible than the conditions under which testing occurred here, never the less, the relative comparison of the AC video and the test video would still remain valid. Of course, in the test video, the announcer has far better speech articulation than in the AC video. Thus, under challenging natural noise conditions, there would be a yet larger benefit shown for the test video.

While communication researchers tend to favour controlled and matched conditions of testing as produced here, there remain some questions about how a noisy environment might degrade comprehension.

Moreover, the present testing was designed to contrast the absolute levels of recall of two videos and to indicate paths to enhancement of comprehension. The absolute level of comprehension for both would certainly be lower if tested in an airplane. But how much lower?

To answer that question, tests in simulated or real airplane sound environments are needed. Continuing up the ladder of proof, tests in airplanes could involve either test participants brought into the plane for testing or, authentic passengers who may or may not be aware of the testing before it begins.

APPENDIX A

Group Briefing

Table A-1: GENERAL SAFETY VIDEO / SYNCHRONIZED TO AIRBUS 340 VIDEO (01 Jul 31)

MEDIUM			*PAX DISABLED and* NON-DISABLED			
NEW AUDIO SCRIPT	**VISUAL**	**NEW CAPTION SCRIPT**	**NON-DIS**	**BLIND**	**DEAF**	**COGN.**
1. Welcome aboard Air Canada. Please listen carefully to these safety instructions and follow any other instructions from the crew.	Music, stock pictures of logo, passengers embarking	Welcome aboard Air Canada. Please follow these safety instructions or any other instructions from the crew.	√	√	√	√
2. Please place small or light things in the overhead bins; put heavier things under the seat in front of you.	Flight attendant assisting in seating	Please place small or light things in the overhead bins; put heavier things under the seat in front of you.	√	√	√	√
3. Put your seat back straight up by pressing the button on the armrest. Lock your tray table. Click your seat belt closed and then make it snug around your hips by pulling the loose end. To open your belt, lift up the cover.	Woman fastening seat belt and tightening strap	Put your seat back straight up by pressing the button on the armrest. Lock your tray table. Make your seat belt snug around your hips. To open your belt, lift the cover.	√	√	√	√

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4. Seat belts must be worn at all times when seated. Return to your seat whenever the seat belt sign lights up or a spoken announcement is made. Do not smoke anywhere on this airplane.	No-smoking sign	Seat belts must be worn at all times when seated. Return to your seat whenever the seat belt sign lights up or a spoken announcement is made. Do not smoke anywhere on this airplane.	√	√	√	√
5. Cell phones, pagers, CD players, computers, or similar devices can not be used until after take-off. Then wait until you are told what devices are OK to use.	Woman putting away laptop under seat in front, placing tray up	Cell phones, pagers, CD players, computers, or similar devices can not be used until after take-off. Then wait until you are told what devices are OK to use.	√	√	√	√
6. Right now, look for your nearest emergency doors or wall openings. In an emergency, lights in the aisles will guide you out.	Graphics of plane exit design, showing exit locations	Right now, look for your nearest emergency doors or openings. In an emergency, lights in the aisles will guide you out.	√		√	√
7. Look in the seat pocket in front of you for the safety instruction card. It explains the safety features of this aircraft. Please review it. A Flight Attendant can	Man taking out safety card and reading it	Look in the seat pocket in front of you for the safety instruction card. It explains the safety features of this aircraft. Please review it.	√	(√)	√	√

8. In a high altitude emergency, an oxygen mask will drop in front of you from the panel above. Place the mask over your mouth and nose, straighten out the strap, and pull the strap to be sure it is tight on your face. After you are wearing it securely, a tug on the hose will start the oxygen flow. It makes sense to put your own mask on first, *before* helping others.	Shot of plane in sky. Oxygen masks dropping. Woman putting mask on, then assisting child.	In a high altitude emergency, an oxygen mask will drop in front of you from the panel above. Place the mask over your mouth and nose, straighten out the strap, and pull the strap to be sure it is tight on your face. After you are wearing it securely, a tug on the hose will start the oxygen flow. It makes sense to put your own mask on first, *before* helping others.	√	√	√	√
9. Every passenger has a folded life jacket in a pouch under your seat or under your armrest. If the airplane has to land in water, grab the life jacket. Put your head through the hole and then pull the jacket over your head. Locate the waist belt, click the belt	Women opening life jacket pouch, removing life jacket and putting it on, fastening and demonstrating how to inflate.	Every passenger has a folded life jacket in a pouch under your seat or under your armrest. If the airplane has to land in water, grab the life jacket. Put your head through the hole and then pull the jacket over your head. Locate the waist belt, click the	√	Can present a great problem without previ-ous know-ledge, no matter	√	Can present a great problem without previ-ous know-ledge, no matter

clip closed, and tighten the belt. To inflate, pull the tabs at the end of the cords; these are connected to little air tanks inside the jacket. If that does not inflate the jacket, then do it yourself by blowing into the tubes. Do not start to fill the life jacket until you are leaving the airplane.		belt clip closed, and tighten the belt. To inflate, pull the tabs at the end of the cords; these are connected to little air tanks inside the jacket. If that does not inflate the jacket, then do it yourself by blowing into the tubes. Do not start to fill the life jacket until you are leaving the airplane.		how good the instruc-tions are. Tests have shown same is true for any other passen-ger.		how good the instruc-tions are. Tests have shown same is true for any other passen-ger.
10. Thank you for choosing Air Canada. We wish you a pleasant flight. If you think you might have trouble following these instructions, please speak with a Flight Attendant.	Plane flying out of sight. Air Canada logo.	Thank you for choosing Air Canada. We wish you a pleasant flight. If you think you might have any trouble following these instructions, please speak with a flight attendant.	√	√	√	√

The script for the live General Safety Demo (before take-off) should be similar to the video script.

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Table A-2: OTHER GENERAL SAFETY ANNOUNCEMENTS

MEDIUM			PAX DISABLED and NON-DISABLED			
NEW AUDIO SCRIPT	**IN-PERSON DEMO**	**TEXT (for future introduction)**	**NON-DIS**	**BLIND**	**DEAF**	**COGN.**
IN-FLIGHT (After take-off or during turbulence)						
1. Just a reminder that you must wear your seat belt at all times when seated. When the seat belt sign lights up or you hear a signal, you must return to your seat, stow your cabin baggage including laptop computers, games, and purses, and snug your seat belt.	Voice only	Just a reminder that you must wear your seat belt at all times when seated. When the seat belt sign lights up or you hear a signal, you must return to your seat, stow your cabin baggage including laptop computers, games, and purses, and snug your seat belt.	√	√	√	√
2. Smoking is not permitted anywhere on this airplane including the washrooms.	Voice only	Smoking is not permitted anywhere on this airplane including the washrooms.	√	√	√	√
3. [as needed] Please return to your seat, stow your cabin baggage including laptop computers, games, and	Voice only	[as needed] Please return to your seat, stow your cabin baggage including laptop computers,	√	√	√	√

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purses, and snug your seat belt.		games, and purses, and snug your seat belt.				
PRIOR TO LANDING						
1. Soon we will be landing in [specify]. Please make sure that all cabin baggage, including laptop computers and purses are safely stowed. You should be comfortably seated with your seat back straight up, your tray table locked, and your seat belt snug.	Voice only After announcement flight attendant walks through aircraft checking tray tables, seat belt and seat back position for each seat	Soon we will be landing. Please make sure that all cabin baggage are safely stowed. Your seat back should be straight up, tray table locked, and seat belt snug.	√	√	√	√
2. Emergency doors and openings are located [describes fully]. For additional information, please consult the safety card located in the pocket in the seat in front of you. Or ask any one of us for assistance.	Flight attendant points to all exits, and location of the safety card	Look again at the emergency doors and openings. Ask any member of the crew for assistance.	√	√	√	√

AFTER LANDING						
1. Welcome to [specify]. The time here is [specify]. For your safety, please keep your seat belt fastened until the sign has been turned off.	Voice only	We have landed. For your safety, please keep your seat belt fastened until the sign has been turned off.	√	√	√	√
2. No smoking is permitted in airports except in designated smoking areas.	Voice only	No smoking is permitted in airports except in designated smoking areas.	√	√	√	√
3. It is forbidden listen to music using headsets or use cell phones until you are inside the terminal building.	Voice only		√	√	√	√
4. Please be careful opening overhead bins because some heavy bags may fall out.	Voice only	Please be careful when opening overhead bins.	√	√	√	√
5. If this is the end of your air trip, please make sure you take all your personal belongings.	Voice only	If this is the end of your air trip, please make sure you take all your personal belongings.	√	√	√	√
6. If you require assistance, please remain in your seat. We will	Voice only	If you require assistance, please remain in your seat. We	√	√	√	√

help you as soon as the aisle is clear.		will help you as soon as the aisle is clear.				
7. Please follow instructions walking from the airplane, and be careful not to trip, [and stay within the pathway markings].	Voice only	Please follow instructions walking from the airplane, be careful not to trip, and stay within any pathway markings.	√	√	√	√
8. While you remain on the plane, it is forbidden to smoke or use electronic devices such as CD players and laptop computers while the airplane is being serviced.	Voice only	It is forbidden to smoke or use electronic devices such as laptop computers while the airplane is being serviced.	√	√	√	√

APPENDIX B

Individual Briefings

TABLE B-1: INDIVIDUAL SAFETY BRIEFINGS – FOR A PERSON WHO IS BLIND

Note: Row distances are depicted to the passenger by saying "to get to PLACE BEHIND, you would count the chair back in your row plus the next NUMBER chair backs" or "to get to PLACE AHEAD, you would count the chair back in front of your seat and NUMBER additional chair backs."

AUDIO SCRIPT	TACTILE INFORMATION
1. Excuse me please, I'm the flight attendant, my name is [.....], if I may take a few minutes of your time, I'd like to explain the safety features on this aircraft.	
2. Please feel free to ask questions at any time, now or later.	
3. You are seated in seat number [...], from the [aisle or window you are...]. To find the washroom, you would [XXX] to the washroom to the [front/rear], and [XXX] to the nearest emergency exit to the [front/rear].	
4. Smaller baggage goes on the floor under the seat in front of you. Have you already put items in an overhead bin? Do you recall which bin that is? Is that a good arrangement or would you like me to make room in the bin directly over your head? Would you like to take my arm and I'll show you where to find the latch for the overhead bin?	*Passenger reaches under front of seat and/or stands up and opens bin. FA indicates latch on bin.*
5. For take-off and landing, your tray table must be locked... and when there are special announcements during the flight. You can reach in front of you and feel the table; the locking catch is at the top.	*Passenger tries table and lock.*
6. Seat belts should be worn at all times you are seated. Please click the two ends together and snug them to your hips by pulling the loose end. To unlock, just lift the cover part.	*Passenger connects and disconnects belt.*
7. For take-off and landing, your seat back must be in the upright position. After take-off, you can lower the seat back by pressing the button on your armrest. You'll find it [...].	*Passenger finds control and tries positioning.*
8. During the flight, if the cabin pressure plunges an oxygen mask will drop in front of you from the panel over your head; it will be at your head height and within easy reach. I can't demonstrate how that works but it will be easy for you to locate the dangling mask. Please take the mask that I am now holding in front of you, place the	*Practice mask set-up with passenger.*

nose part over your nose and also cover your mouth; pull the rubber strap behind your head and make sure it fits snugly all around. But the oxygen flow will not start until you give the hose a tug. If you are trying to help another passenger, please put your own mask on *first*, just as they should do if they were helping you.	
9. In the event of an emergency landing on water, put on your life jacket. The jacket is located in a pouch [under your seat / below your armrest]. If you could please feel for it right now. If you don't mind, please try on the life jacket. First, unfold the life jacket and find the large opening, and put this over your head. Grab the waist belt clips, they may be dangling at your back, click them together and tighten. There are two tabs in front of the jacket at chest height. [Can you feel them?] Pulling these tabs should inflate the jacket. But if they don't work, blow into these tubes. You shouldn't inflate them until leaving the plane because otherwise you may not fit through the exit.	*Passenger finds jacket and tries it on with assistance of FA, adjust script to circumstances as needed.*
10. This is all I wanted to say for now. Do you read Braille? [You can review the features in this safety card I am handing you now. Be sure to give it back to me during the flight] There [will also be / was] a general safety briefing for all passengers [once everybody has boarded and we are ready for take-off].	*FA hands passenger Braille card.*
11. If you need any help, please press the call button [which looks/feels/positioned on the panel above your head. Would you please reach up and I will locate the button. I wish you a pleasant flight.	*Passenger reaches up and identifies button.*

BTEAM/RDI

TABLE B-2: INDIVIDUAL SAFETY BRIEFINGS – FOR A PERSON WHO IS DEAF, COGNITIVELY IMPAIRED, OR REQUIRES SIMPLIFIED LANGUAGE

FA should have the Cue Card Deck and a pad-and-pencil when conversing with a deaf passenger.
Note: This material should be available as a handout card, preferably handled by an agent upstream.

SIMPLIFIED HAND-OUT TEXT	ATTENDANT'S CUE CARD DECK	VISUAL SCRIPT
	I am the flight attendant and I will give you a safety briefing of the features on this aircraft. I will point to places on the card you are holding and then to the features. [card with name of FA]	*Big smile!*
1. Your Flight Attendant has a pad and pen. Please feel free to ask questions at any time.	Please feel free at any time to ask a question. We can use [this] pad and pen.	
2. Please place your hand baggage on the floor under the seat in front of you or in the overhead bins. There is no smoking at any time on the airplane or washrooms.	Larger or heavier things should go into overhead bins. Put smaller things under the seat ahead of you. There is no smoking at any time on the airplane or in the washrooms.	*FA points to locations.*
3. Cellular phones or wearing headsets connected to a personal CD player are not allowed.	No TDD or pager messages can be sent while in the airplane.	
4. Laptops can be used once we are in the air and the seat belt sign is off.	Laptops are OK, but only while we are in the air.	*FA points to seat belt sign at panel.*
5. Raise your table during take-off and landing and whenever the seat belt sign is on.	Raise your table during take-off and landing and whenever the seat belt sign is on.	*FA points to tray table.*

6. Wear your seat belt at all times. Please connect the two ends and snug them over your hips. To unlock, lift the cover.	Wear your seat belt at all times. Make the seat belt snug over your hips by pulling the loose strap.	*FA demonstrates seat belt and buckle.*
7. For take-off and landing your seat back must be straight up. You can change the seat back position by pressing the button on your armrest.	Seat backs must be upright during take-off and landing and whenever the seat belt sign is on.	*FA points to seat back and control button in armrest. FA confirms seat is upright.*
8. In an emergency, the aisle lights will guide you to an emergency exit.	These lights will guide you to the exits during an emergency.	*FA points to lights and exits.*
9. During the flight the air pressure might change. An air mask will drop down in front of you. Please watch how to use the mask. If you are trying to help another person, please put your mask on first.	Watch me put on the mask. If you are trying to help another passenger, please put your mask on first. Be sure it fits snugly all around.	*FA demonstrates oxygen mask with sample.*
10. In the event of an emergency over water, you must put on your life jacket. The life jacket is located in a bag [under your seat or below your armrest]. Please watch how to use the life jacket. You will find a large hole in the jacket for your head. You will find a belt at your side or back with clips on each side for locking. Tighten the belt. On the chest, there are two pull-tabs. Pulling these tabs will blow up the jacket. If that doesn't work, blow into these tubes. You would only inflate them just before leaving the aircraft.	Watch me put on the life jacket. You would only inflate it just before leaving the aircraft.	*FA points to location of life jacket and demonstrates use of jacket. By gesture, indicates how unmanageably large the inflated jacket would be if inflated in the cabin.*

11. You can learn more about safety by watching the demonstration.	Any questions? This is the end of your safety briefing. Please review the features in your safety card. There also is a general safety briefing for all passengers once we are ready for take-off.	*FA shows location of safety card.*
12. Should you require any help or information please press the help button on the panel over your head. Have a pleasant flight.	For more help, press the help button on the panel above your head. Have a pleasant flight.	*FA points to call button.*
DURING FLIGHT		
If the flight is rough, please return to your seat immediately and fasten your seat belt. Store all things under the seat ahead or in the bin over your head.	We are having turbulence. Please return to your seat immediately and fasten your seat belt. Stow all your baggage including your laptop and all hand baggage.	
PRIOR TO LANDING		
Before landing, check the following: • cabin baggage is stored properly • seat back is up • tray table is locked • seat belt is snug • look for the nearest emergency exit	We are landing soon, please check the following: • cabin baggage is stored • seat back is up and tray table is locked • seat belt is snug • Do you know the location of the nearest emergency exit?	
DEBOARDING		
Please remain seated until the airplane comes to a complete stop. Make sure you take all your belongings with you. Thank you for flying [Air Line]. Have a nice day.	Please stay in your seat until we come to a complete stop. Make sure you take all your belongings with you. Thank you for flying [Air Line]. Have a nice day.	

APPENDIX C

Messages in the video briefings

Air Canada A340 video	**BT/RDI test video**
storing your things, or about seats, trays, or seat belts	**storing your things, or about seats, trays, or seat belts**
coats/carry-on overhead	small/light overhead
coats/carry-on or under seat	heavy under seat in front
for take-off sit comfortably	seat up
chair straight	tray up
tray straight up/locked	tray locked
close belt	click seat belt closed
adjust around hips	make snug
release lift buckle	by pulling loose end
recommend seat belt at all times	open by lifting cover
when SB essential, light goes on	wear at all times
and announcement	return to seat upon notification
your electronic devices	**your electronic devices**
no cell phone use	use none until after take off
laptop OK after SB sign is off	cell phones
check with crew re other gear	pagers
	CD players
	computer
	similar devices
	await specific approval after take off
exits, doors, and leaving plane in emerg.	**exits, doors, and leaving plane in emerg.**
aisle lights will guide you to exit	aisle lights will guide you
emergency doors in pictorial, note them	look for nearest emergency doors
[noticed in pictorial]	look for nearest emergency wall exits
	[noticed info in pictorial]
oxygen mask	**oxygen mask**
automatic drop in pressure changes	automatic in high altitude emergency
remain seated	mask will drop down from panel above
use support strap to put on	place over mouth

over mouth
and nose
breathe normally
yourself before helping others

life jacket
remove pouch in seat
or armrest
place over head
fasten waist clips
tighten belt
pull tabs to inflate
if not inflating, blow into tubes
inflate only upon leaving

other
crew responsible for safety
safety instruction card in seat pocket
review card prior to take-off
for questions, ask Flight Attendant
no smoking

and nose
straighten strap
ensure it is tight
tug to start oxygen flow
yourself before helping others

life jacket
in pouch
in arm rest
under seat
head in hole
pull over head
locate waist belt
click
tighten
pull tabs to inflate
blow in tubes if tanks fail
don't fill until leaving plane

other
follow instructions from crew
safety instruction card in seat pocket
available in Braille
for questions, ask Flight Attendant
no smoking